



- (19) Japan Patent Office (JP)
- (12) Patent Application Laid-open (A)
- (11) Publication: Sho-62-215947
- (43) Date of Publication of Application: September 22, 1987
- (54) Title of the Invention: PHOTSENSITIVE COMPOSITION AND  
PHOTSENSITIVE PLANOGRAPHIC PRINTING PLATE
- (21) Patent Application: Application Number Sho-61-58150
- (22) Application Date: March 18, 1986
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### Specification

#### 1. Title of the Invention

PHOTSENSITIVE COMPOSITION AND PHOTSENSITIVE  
PLANOGRAPHIC PRINTING PLATE

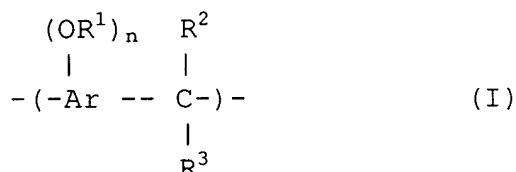
#### 2. Claims

(1) A photosensitive composition comprising a compound  
which generates an acid by an exposure to light, and a compound

containing at least three acetal bond portions which are decomposed by the acid within a molecule.

(2) A photosensitive composition according to claim 1, wherein the compound decomposed by an acid is a novolak resin containing at least three acetal bond portions within a molecule.

(3) A photosensitive composition according to claim 2, wherein the novolak resin has a constituent unit represented by a following general formula (I):



(wherein Ar represents an aromatic group;  $\text{R}^1$  represents a 2-cyclic ether group;  $\text{R}^2$  and  $\text{R}^3$  each represents a hydrogen atom, an alkyl group or a phenyl group; and n represents a number of 3 or larger.)

(4) A photosensitive composition according to claim 1, further comprising an alkali-soluble resin.

(5) A photosensitive composition according to claim 4, wherein the alkali-soluble resin is a cresol-formaldehyde resin or a phenol-cresol-formaldehyde resin.

(6) A photosensitive planographic printing plate comprising, on a substrate, a photosensitive layer containing a compound which generates an acid by an exposure to light, and a compound containing at least three acetal bond portions

which are decomposed by the acid within a molecule.

### 3. Detailed Description of the Invention

A positive working photosensitive composition, containing an o-quinonediazide compound which generates a 5-membered cyclic carboxylic acid and becomes soluble in alkali by an irradiation of an actinic ray, is widely utilized industrially for the manufacture of a planographic printing plate or for a photoresist.

However, such photo-soluble positive-working photosensitive composition, formed by such prior o-quinonediazide compound and a novolak resin generally has a lower sensitivity, in comparison with a negative-working photosensitive composition utilizing a photopolymerization reaction or a photocrosslinking reaction, and requires a long working time.

Therefore, a novel photosensitive substance of a high sensitivity, capable of replacing o-quinonediazide compound, has been desired.

There is recently proposed a photosensitive composition, formed by combining a compound capable of efficiently absorbing the light of a metal halogen lamp and generating an acid, and

a compound capable of efficiently causing a decomposition reaction catalytically by the acid and increasing the solubility of photosensitive layer in a developing solution. For such compound decomposable by the acid and capable of increasing the solubility, there are proposed, for example, an acetal containing a monovalent or divalent aromatic group or a combination with an o, N-acetal compound (USP 3,779,778), an orthocarboxylic acid ester, a carboxylic acid amidacetal (GP 2,610,842), a polymer having an acetal or ketal group containing an aliphatic group in a main chain (JP-A-53-133429), an enol ether compound (JP-A-55-12995), an N-acyliminocarbonate compound (JP-A-55-126236), a compound having a silyl ester group (JP-A-60-10247), and a compound having a silyl ether group (JP-A-60-37549).

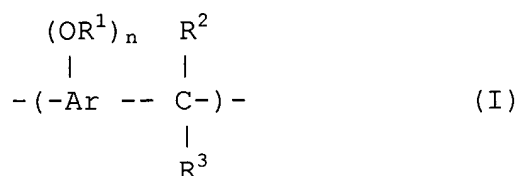
However the combination of compounds having an orthocarboxylic acid ester group, a silyl ether group and a silyl ester group has a high sensitivity but is inferior in the storage stability, while the compound having an acetal or ketal group containing a monovalent or divalent aromatic group or an aliphatic group is excellent in the storage stability but shows a low sensitivity, so that both are insufficient for practical use.

The present inventors, having paid attention to such compound which is decomposed by an acid and increases the

solubility and as a result of intensive investigations undertaken for providing a novel compound having a higher sensitivity and not showing the aforementioned drawbacks, have come to know that the aforementioned objects can be accomplished by utilizing a compound having at least three acetal bond portions which are decomposed by an acid.

The compound having at least three acetal bond portions within the molecule, to be employed in the present invention, is a compound in which such acetal bond portion is decomposed by an acid, generated by the exposure to light, to form an alcohol residue, thereby increasing a solubility in a developing solution such as an aqueous alkali solution.

Examples of such compound include a novolak resin having at least three acetal bond portions within the molecule, for example a novolak resin having a constituent unit represented by the following general formula (I):



In the general formula (I), Ar represents an aromatic group, for example an aryl group such as a phenyl group or a naphthyl group;  $R^1$  represents a 2-cyclic ether group such as (chemical formulas);

$R^2$  and  $R^3$  each represents a hydrogen atom, an alkyl group such

as a methyl group, an ethyl group or a propyl group, or a phenyl group; and n represents a number of 3 or larger.

The novolak resin having the acetal bond portions of the present invention, thus obtained, has a molecular weight range normally in a weight-average molecular weight Mw of from 100 to 10,000, and preferably in a weight-average molecular weight Mw of from 200 to 8,000, and with a dispersion within a range of from 1 to 20, preferably from 1 to 15.

The constituent unit having at least three acetal bond portions, as represented by the general formula (I), normally represents a proportion from 5 to 100 wt% within the obtained novolak resin, preferably from 10 to 100 wt%.

An amount of the compound having at least three acetal bond portions within the molecule, to be employed in the present invention, is from 2 to 80 wt% with respect to all the solids in the photosensitive composition of the present invention, preferably from 5 to 60 wt%. The amount is preferably selected within the aforementioned range, since an amount less than 2 wt% tends to reduce the sensitivity at the exposure, while an amount exceeding 80 wt% deteriorates the developing property.

The photosensitive composition of the present invention is usable by the combination of only the compound capable of generating an acid by an exposure to light and the compound including at least three acetal bond portions decomposable by

the acid, but an alkali-soluble resin may be further added for improving other properties such as a chemical resistance and a solubility of the photosensitive composition.

In the present invention, a content of such alkali-soluble resin is preferably from 30 to 90 wt% with respect to all the solids in the photosensitive composition, and particularly preferably from 50 to 85 wt%.

In the photosensitive composition of the present invention, a singlet or triplet energy transferring substance may be added for the purpose of improving the acid generating effect.

In the photosensitive composition of the present invention, a printout material may be added for the purpose of forming a visible image by an exposure to the light.

In the photosensitive composition of the present invention, in addition to the aforementioned components, various additives may be added if necessary.